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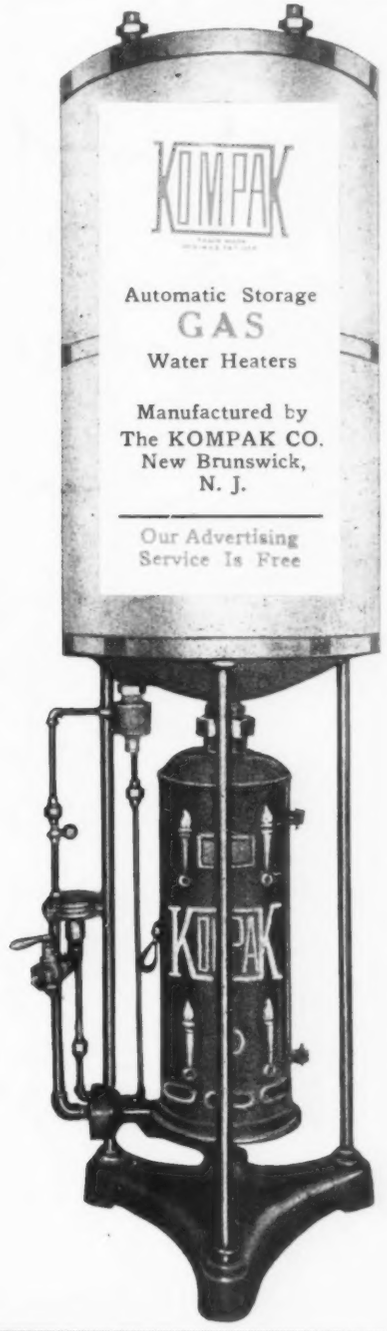

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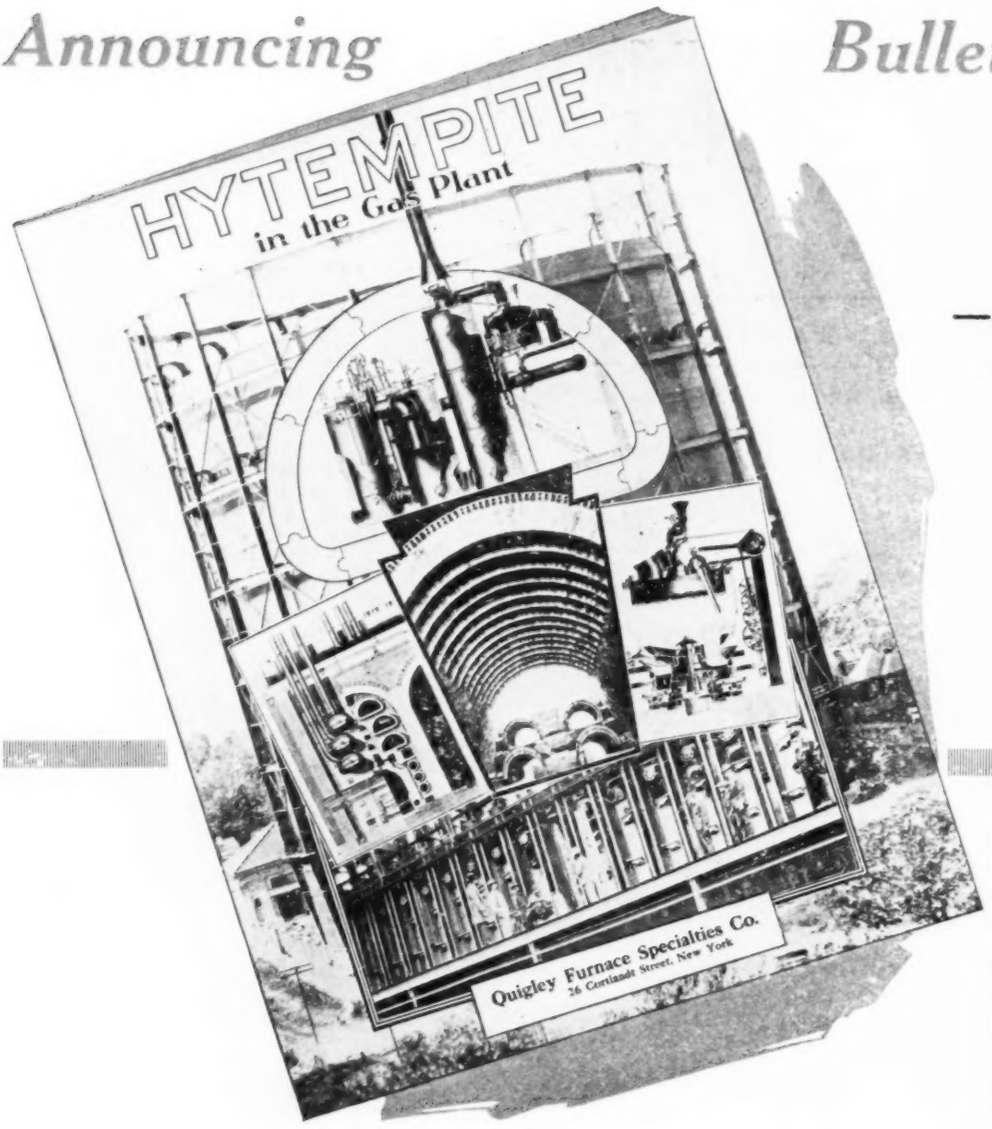

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The Composition of Certain Special Cements and Solders Into the Manufacture of Which Gas Enters

Brass Soldering — Chemical or Cold Soldering—Enamel Soldering—Glass and Porcelain Soldering With Metals—Soldering Cast-Iron

By GILBERT C. SHADWELL

In a recent article on a subject connected with the present one, some details were given on hard and soft common solders, silver and gold solders, with some information concerning the soldering of aluminum. It is now proposed to deal with solders for special purposes and to briefly touch on some of the cements which are or can be made largely by the aid of gas as a fuel.

Brass

For soldering with sheet brass by the aid of a soldering "iron" or copper, it is usual to employ a solder made of 2 parts of tin and 1 part of lead, by weight. This is melted in a soft-metal furnace which can easily be of the atmospheric type, but it is most convenient if a bottom outlet is provided. This style has already been described in a previous article.

When melted, the solder is poured into a mold so as to make small bars. For this, zinc is dissolved in hydrochloric acid until no more will combine. One-tenth of its bulk of sal ammoniac is then added, and it is diluted with one-quarter of its bulk of water.

Can Tops

The can tops, which use a sealing solder, have the latter, consisting of lead, 1¼ parts by weight; tin, 2 parts, and bismuth, ⅛ part. The lead is melted first; then the tin is added. The bismuth is lastly stirred in, just before pouring. This makes a soft solder and the cans do not take much heat to seal them.

Cold or Chemical Soldering

Various so-called solders or cements have been brought forward from time to time which profess to be reliable methods of soldering without heat but which have generally proven useless. They therefore are scarcely of interest to the gas man. The following, however, is a semi-cold process which has some value, and it is a neat method of soldering small articles: A piece of tinfoil is cut to the size of the surfaces to be soldered. A feather is then dipped in a solution of sal ammoniac and the surfaces of the metal are painted; they are then placed in their proper position, with the tinfoil between. It is then heated just hot enough to melt the tinfoil; when cold the whole will be firmly soldered together. An iron will do the work nicely if at the right heat.

For soldering without the use of an iron the parts to be joined are made to fit accurately, either by filing or on a lathe. The surfaces are moistened by the aid of a suitable soldering fluid; a smooth piece of tinfoil is laid on and the pieces are pressed together and tightly wired. The article is then heated over a suitable gas burner until the tinfoil melts. In this way two pieces of brass can be soldered together so nicely that the joint can scarcely be found. The fluid is hydrochloric acid with zinc dissolved in it till it will take no more.

Enamel Solder

Enamel solder is composed usually of 25 parts of copper, 7.07 parts of silver and 67.93 parts of gold. The refractory enamel solders are made of 18 parts of silver and 74 parts of gold, however.

Process of Soldering Glass and Porcelain with Metals

The writer has a note of an interesting process of soldering glass and porcelain with metals which may be of value to readers. It has been employed by chemical apparatus manufacturers and others for the purpose of joining a cock, tube or electric wire, etc., to scientific apparatus so as to prevent any leakage even under high pressure. The process is really quite simple.

The portion of the tube that is to be soldered is first covered with a thin layer of platinum. This deposit is obtained by covering the glass, which is slightly heated, by means of a cement with very neutral chloride of platinum, mixed with essential oil of camomile. The oil is slowly evaporated, and when the vapors cease to be given off the temperature is raised to a red heat; the platinum is thereby "reduced" and covers the glass tube with a bright layer of metal. On fixing the tube thus "metallized" and placed in a bath of copper sulphate to the negative pole of a battery or other suitable electrical energy there is deposited upon the platinum a ring of copper which should be malleable and very adhesive if the operation has been properly performed. In this state the glass tube covered with copper can be treated like a genuine metallic tube and be soldered by means of tin, copper, bronze, platinum and all metals that can be united with tin solder. The resistance and strength of such soldering are very great. It has been found to resist more than 300 atmospheres.

The tube may be silvered in place of being platinized. This is done by using silver nitrate and then heating up to a dull red heat. The silver thus reduced also adheres to the glass in the same way as the platinum. But silver is not so good as platinum, as a rule, and the small amount required as a base does not generally make a vital difference in the cost.

The Soldering Together of Glass

The soldering together of glass is usually effected with the aid of a metal alloy consisting of 95 parts of tin and 5 parts of zinc. The melting point of this alloy is about 425 deg. Fahr. The glass to be soldered is most carefully heated to the temperature named and the alloy is then spread on the glass with the aid of a soldering iron, and on cooling it will be firmly attached to the glass. An alloy of 90 parts of tin and 10 parts of aluminum can also be used for the same purpose; but not so conveniently, as it does not melt until it reaches 830 deg. Fahr.

The glazier's solders are made of lead, 5 parts, and tin, 1 2/3 parts. This melts at about 500 deg. Fahr.

Soldering Cast Iron

In the case of soldering cast iron, the place to be soldered has to be very well cleaned. Then it is brushed with a brass-wire brush until the iron becomes yellow. It will be found that the solder can now be applied without any trouble.

Nickel Solder

For fine or high-grade nickel, 3 parts of yellow brass and 1 part of sterling silver are used. For low-grade nickel 15 parts of yellow brass, 5 parts of sterling silver and 4 parts of pure or plate zinc are used. The brass is melted with the silver, and borax is used as the flux. The zinc is added in small pieces. This is stirred with an iron rod; then it is poured into a slab mold and cooled slowly. It can then be rolled thin for cutting.

Solders for Pewter and Britannia Metal

The first of these is made of 10 parts of tin, lead 5 parts and bismuth 1 to 3 parts. The second is made of 3 parts of tin, 1½ parts of lead and 1½ parts of bismuth. The third is a good solder also for tin or pewter, and is composed of 2 parts of tin, 1 part of lead and 1 part of bismuth. The fourth is valuable for soldering pewters and so-called "composition" pipes. These latter usually require rosin as a flux, with very thin strips of the more fusible solders, care being taken that the iron is not too hot.

The Soldering of Platinum to Gold

To make platinum adhere firmly to gold by soldering, it is necessary that a small quantity of fine or 18-karat gold shall be sweated into the surface of the platinum at nearly a white heat, so that the gold shall soak into the face of the platinum. Ordinary solder will then adhere firmly to the face obtained in this manner.

Hard solder acts by partially fusing and combining with the surface to be joined, and platinum alone will not fuse or combine with any solder at a temperature anything like the fusing point of ordinary gold solder.

A Utility Solder-Cement

There is a useful kind of solder which is of interest. This is a soft alloy which attaches itself so firmly to the surface of metals, as well as glass and porcelain, that it can be employed to solder articles that will not bear a very high temperature. It can be made as follows: Copper (which is obtained by precipitation from a solution of the sulphate by means of zinc) is put into a cast-iron or porcelain-lined mortar, and this is mixed with strong sulphuric acid (specific gravity 1.85). Take from 20 to 30 or 36 parts of the copper, according to the hardness desired. In the cake thus formed of acid and copper there is added 70 parts of mercury, stirring constantly the while. When well mixed, the amalgam is carefully washed with warm water to remove all the excess acid, and then set aside to cool. In ten or twelve hours it is found to be hard enough to scratch tin.

When it is used it is heated hot enough so that when worked in an iron mortar it becomes as soft as wax. In this ductile form it is spread on a smooth surface, to which it adheres when it gets cold and hard.

Cements Proper

Of cements proper we may make a general classification as follows: Acid-proof, aquarium or waterproof cements; barrel and cask cements; building cements; casein; celluloid; dental; glass, etc.; jeweler's; leather; mechanic's; metals; metals to glass, etc; metals to leather, etc.; microscopist's; wood to wood, and miscellaneous, or cements for minor uses.

Among other adhesives we have glue, lutes, mucilage, pastes, pastes for special uses, putty and special adhesives.

Some of these are of only passing interest to the

(*Continued on page* 130.)

European Gas Industry Faces Many Difficulties

Governments Realize Importance of Utilities in Settling-Down Process, and Statesmen View Them as of Importance Second Only to Rectifying Peace Treaty

By L. W. ALLWYN-SCHMIDT

Recent news from Europe gives evidence that the European gas industry still is in the middle of its reconstruction worries and that most likely no peace will come to the harassed gas men until the whole political upheaval has been settled in one or the other manner. It begins to show more and more that the rulings of the peace conference have not produced real peace and that considerable changes will have to be made before the European nations can settle down again to their every day work. The sufferer of course is not only Europe but the whole world. Europe cannot continue on the verge of social revolution without disturbing the economic organizations of the world. Before Europe can do, however, useful work, it is necessary that its public utilities should function again. Railroads must operate on schedule time, light and power must be supplied at equitable rates and in sufficient quantities.

This all is fully realized by the European governments and next to the attention which is given just now to the correction of the more outstanding mistakes of the original peace treaty interest centers around the reorganization of all forms of public service.

It is this consideration that has led to the passing of the gas regulation bill in England, a lengthy document destined to regulate the future production and distribution of gas. The bill possibly does not bring any fundamental changes in the general policy adopted by governments with respect to their public utilities, but it has produced a rather interesting side issue. When the bill was in committee the motor industry and other interests connected with the motor industry tried to insert a clause in the bill for making it obligatory for the gas industry to wash the gas and to extract the benzol. This would mean a rather new venture in utility legislation.

But the gas industry somehow did not see its way to accept this clause out of reasons that will be readily realized in this country. No doubt an official recognition of the great value of the gas industry as a conserver of intermediates would have been appreciated by the gas industry. Also there is, no doubt, justice in the demand that all fuel that is burned should be burned as economically as possible, and the extraction of benzol would doubtless add to the available benzol supplies.

But the law singled out the gas industry for this particular purpose. The gas industry is by no means the largest consumer of coal. Coal is burned in much larger quantities by the general industries which might be just as well compelled to make some sort of arrangements to save coal by-products as it was tried with reference to the gas industry.

Making by-products, and this includes the washing of gas for the purpose of separating benzol, requires certain preparations and an installation that might be rather costly in the case of a small plant. This plant then would operate much more expensively than all its competitors and it would be severely handicapped, for instance, against any electrical plant in the neighborhood that might fire to the skies any desired quantity of benzol without troubling about its previous extraction.

The quantities of benzol that would be thrown upon the market by such a wholesale generation would bring the price of the product down to a level that might make unprofitable its production by the gas industry, which then would be compelled to produce benzol to its own disadvantage. While the gas industry, therefore, realizes fully the importance of saving the by-products it is of the opinion that such a saving must be effected upon a strictly commercial basis. The gas plants can save benzol when it pays them to do so and this right was not taken from the industry in the present law.

On the other hand there is a chance for legislation to make an attempt to force a more economic use of coal in the interest of national conservation policy. This subject, by no means, is dead in England and in the rest of Europe and while the present case was not a very suitable one to effect legislation to that end there is every hope that an attempt will be made to regulate the consumption of coal by all large consumers in a manner to guarantee the most profitable utilization of all its component parts.

Co-operation Between Gas and Electricity

The problem of bringing about a closer co-operation between the electrical and gas industry which is closely connected with the preservation of coal energy has found very intimate discussion in a meeting of engineers and scientists following a lecture by Sir Dugald Clerk on the Distribution of Heat, Light and Motive Power by Gas and Electricity. The second meeting held for the special purpose of this discussion took place at the Institute of Mechanical Engineers in London, where also the lecture was read several months ago. While the discussion does not appear to have brought any definite plan for such a co-operation, there is no doubt that the subject is finding considerable attention in England and in fact all over Europe as one of the most outstanding problems of today. Germany has taken already very definite steps for the execution of such a co-operation by proposing to use its large lignite resources for the purpose, and the question has been discussed in France from a similar point of view as will be explained later on.

At the present time the two principals in the discussion are still standing wide apart. But the general ventilation of all the questions concerning power production and distribution by the aid of public utilities has the advantages that a great many new issues are raised which would not have come to notice otherwise. So, for instance, it has been pointed out that the present means of gas consumption are faulty in many respects.

Saving Coal by Saving Gas

It is said that while the gas industry is only too ready to invent all kinds of means to get between the coal and the coal consumer it has not aided materially in reducing the consumption of coal. In fact, it does everything possible to increase the consumption of gas. What it should do rather would be to produce better results with less gas. There is no denying that the commercial exploitation of all public utility service will bring about a certain misuse of the powers conceded to public utilities.

A gas company operating in a district likes to increase its sales sufficiently in order to make a profit for its shareholders. Against this it must be held that the consumer himself is not so much interested in the cost he pays for the unit, but rather in the service he receives.

If he has to pay now, say $2.00, for his kitchen gas a month he will kick severely if he has to pay $3.00 as the result of an increase in rates.

If he receives, however, thrown in, heat for his bed room and hall he will cheerfully pay the $3.00, because there is some definite value added.

Our gas men have realized now that the old open burners for gas lighting are the most wasteful lighting fixtures in existence and they are replaced rapidly by the better incandescent lamps and similar devices. But we continue nevertheless to burn our kitchen stoves cheerfully, blowing the gas in all possible directions only not there where it is actually required, which is below the pot.

It has been estimated that only ten per cent of the actual heating value of the gas is brought to bear upon the object to be heated by the present arrangement and that 90 per cent of the gas is wasted. A different arrangement of the heaters would change this immediately and would produce better concentration of the heating value.

Several devices have been proposed for this purpose in Europe and now the proposition is made to construct special heating storage arrangements in connection with gas kitchen stoves that would reduce the consumption of gas very materially, making it available for other purposes in the house.

Science knows a great many materials that will retain heat much better than any others. These materials should be used in connection with gas stoves and gas heaters. This opens an entirely new aspect to the operation of gas enterprises. Take, for instance, the case of a medium sized gas plant in a city that has reached the capacity of its production but has to face an increase in the demand. At the present time the usual way to deal with this problem is to increase the capacity of the generating plant which means a considerable expenditure for equipment, additional personnel and also more coal. Naturally more gas also is sold and the company, therefore, is presumably making a larger profit. The new way of handling this problem would be to leave the capacity plant as it is, but to install new consumption equipment which reduces the consumption of gas but gives the same results to the consumer. In this manner the individual consumption of gas might be reduced to one-half and the surplus could be made available to the new consumers. To compensate the gas company for the additional outlay for the new consumption equipment or the necessary alterations the gas rates would have to be increased or a new system of charges would have to be introduced under the understanding that the total charge will not be higher than that paid at the time when the change is made.

New Municipal Houses Equipped with Gas

Europe has just now an excellent chance of putting to test many of the new ideas in gas distribution by the various large housing schemes that are in preparation. Thousands of houses, for instance, will be built during the next few years by English municipalities to relieve the housing shortage and the new districts will all be equipped with gas and electricity. To secure the supply of gas the gas works have mostly made arrangements with the contractors to pipe the districts at their own cost or upon the basis of a mutual share of expenses. This gives to the gas company the guarantee that the facilities for the use of gas will be installed in the district and it is then left to the enterprise of the agents of the company to make such connections as can be made Considering that a similar condition exists in the United States at the present time and that most likely thousands and thousands of new houses of all character will have to be added to the present housing resourves of this country, it seems that the American gas industry should study very well the experiences of Europe with a view whether part of the European scheme cannot be employed also with advantage in the United States. The fact that many of these European innovations may be revolutionary when viewed with the eyes of an American gas man should not detain from their application. There is a great deal revolutionary to the European mind in our way of doing things in America but nevertheless much of it has been adopted. So, there is little reason why we suddenly should be conservative and not apply that what is found to be good in other countries. The old objection, that it will do very well abroad but does not hold good in this very United States, is stale and should not be heard again in connection with gas enterprise. We are the most promising branch of all industrial activity and it is our own fault if we cannot make the headway that we should.

Labor Unrest Continues

Europe still is seriously troubled by labor unrest. After having been comparatively quiet in this respect, England is now having its share of the trouble and the chances are that the English gas industry will not escape a severe shaking up. The English gas companies have been rather slow with meeting the demands of their men and incidentally their officials and there is much mutual sympathy between the two. As in all cases of this sort the public seems to be inclined to take the side of the employees and one can make the prediction that wages and salaries will be higher in the English gas industry in a few weeks from now than they are today. Only by giving the men what is their due the gas industry can hope to retain a highly qualified staff of workers which is especially essential during the present period.

English gas companies which have done already much to popularize the use of gas have now established a new precedent by the enterprise of the Plymouth Gas Co., which has actually built and put in operation an all-gas house. This is a cottage of six rooms which is entirely heated and operated by gas. To demonstrate to the public that this is not a toy but a reality, the cottage is used by the family of one of the employees of the

company. Apart from the great saving of space which is entailed in the use of gas instead of other heating facilities the house has many features that should make it attractive to the average English householders. Hot water is supplied to all the three bedrooms, there is a drying board for the dishes in the kitchen and a gas heated laundry room. It will be interesting to see how the house will make out in the matter of operation cost. Reports, no doubt, will be published from time to time. In the meantime a small model of the house has been made which is used for propaganda purposes and finds much attention.

Coal Problem Still Unsolved

On the European continent the coal problem is still uppermost in the minds of all gas men. It is that of the economic problems of continental Europe which is most closely interwoven with the peace treaty and which seems to give the greatest trouble to settle. When the peace treaty was written it was assumed that Germany could be stripped of a large part of its coal production in the western area, which coal then was to go to France, Belgium and Italy, which in this manner would have become independent from English coal supplies. The plan has not worked and has been subjected to a considerable correction during the recent conference in Spa. Gas men in France have not yet had time to express their views on this matter but the impression is growing in France that the French gas industry will have to shift for itself and cannot wait upon the diplomats. At the present time certainly coal is wanted more than diplomatic victories and if the diplomats cannot produce the coal the French gas industry is willing to make its own arrangement, even to the point of using the French lignite. The lignite available in France is considerably inferior to British and French coal in calories and the respective results are as follows: British coal 166,916 calories, French coal 149,510 calories and lignite 133,878 calories. In view, however, of the fact that the German gas industry seems to be set upon making use of the German lignite beds for gas production, there is no reason why the French gas industry should not do the same. After all, the arrangement of the peace treaty must end one day and there is evidence that it will hurt finally more the countries receiving the coal than that which is to produce it, because the imported coal will form a serious impediment to the development of the French coal resources. There is another provision of the treaty which finds severe criticism in France. It is that providing for the supply of large quantities of German tar and benzol to the allies during the next three years. Fifty thousand tons of tar and 35,000 tons of benzol will enter one or the other of the allied countries by this arrangement which naturally is just as much tar or benzol taken from the by product plants of the gas works in these countries. In fact the whole dye stuff and tar products arrangement of the treaty may finally lead to crippling the by-product industry of the gas works in France, Belgium and Italy. At the present time the Germans, of course, find great difficulty in producing the required quantities of both. Before the war Germany made 1,400,000 tons of tar but the output has declined now to 650,000 tons with little hope for an early recovery.

A Miner's Yearly and Daily Output of Coal

How the American Miner's Production Compares with Miners of Other Nationalities

By W. W. Adams, Mine Statistician, U. S. Bureau of Mines

The present world-wide demand for increased production in all branches of essential industry involves a matter of vital concern to persons engaged in the mining industry, namely, the productive capacity of the individual mine employee. This applies particularly to coal mining, upon which other industries so largely depend.

The folded and faulted condition of the coal beds in some countries, as well as the thinness and depth of the seams, the adaptability to the beds of available mining machines and equipment are factors which cannot be overlooked in determining what increase in individual output may be looked for in any given country. This subject, while of fundamental importance, can only be referred to in a paper of this length, the primary object here being merely to present a comparative statement of individual output under prevailing conditions.

The quantity of coal produced by a miner does not accurately indicate the miner's capacity as a workman, not only because of the natural conditions referred to above that limit his annual output, but also because of human factors which may possibly, however, be controlled, such as the demand for coal, the car supply, use of labor-saving machinery, number of days worked during the year, accidents in the mine, etc. It will, however, be an aid in answering the important question as to how and where the immediate need for coal throughout the world may best be supplied, if we examine the output of the miners in the important coal-producing countries over a period of years.

Complete official information for recent years is, for several countries, lacking, particularly for France, Austria, and Prussia, but partial data from unofficial sources may be used to show the individual output of the miners in these countries.

An examination of the available and in most instances official sources of information for the principal coal mining countries (covering generally the 18-year period beginning with 1901) shows that the largest production per man during any year was 1,134 short tons, which represents the average production for each underground employee in the coal mines of the United States during 1918. The closest competitor of this country was New South Wales where each underground worker in 1918 produced 814 tons. The smallest individual output for recent years was that of Japan in 1917, where an average of 155 tons was mined by the underground employees, although in 1901 India showed an average of only 122 tons, the latter figure being the smallest during any year for the countries under consideration. During the eighteen-year period New South Wales and Nova Scotia have each averaged practically the same amount (718 and 715 tons respectively). The individual output for Great Britain was until 1910 above that of Prussia, but in 1911 Prussia passed the British record and has maintained the lead since that time. France has shown but little change in the miner's yearly production, averaging 302 tons prior to the war. Within the past three years, however, the daily output of the French miner has decreased although there has been an increase in

his wages. In Austria the annual output has averaged 296 tons per man during the past 18 years. Following Austria comes Belgium with an average of 236 tons during the 18-year period. The man production in Belgium remained around 250 tons until 1914, when it dropped to 200 tons and showed only a slight increase during the five years of the world war. The underground workers of India have shown an almost steady increase in annual output, the quantity having risen from 122 tons in 1901 to 203 tons in 1918, averaging 178 tons during the entire period. In Japan the average output over a seventeen-year period was 174 tons. The following paragraphs will show more in detail the situation in the various countries:

United States

In producing around 600 million short tons of coal each year the United States employs about 600,000 underground workers. In 1901 these underground employees produced an average of 729 tons per man. Eighteen years later the quantity had increased to 1,134 tons, the greatest on record for this or any other country. At the beginning of this period one-fourth of the bituminous coal was mined by machines while at the end of the period the quantity of machine-mined coal was about 56 per cent of the total bituminous production. Again, the high average thickness of the coal seams and the comparatively regular and uniform position of the coal beds (except in the State of Washington and the anthracite field of Pennsylvania) greatly facilitate the work of the miner in getting out the coal. About 85 per cent of the bituminous coal is mined from seams below three feet in thickness. Seams less than 2 feet thick do not produce as much as 1 per cent of the total production. Nor is coal mined at as great depths in this country as is the case in some of the foreign fields.

The underground workers in the United States do not include any women or girls.

Not only the annual but also the daily output of coal per underground worker is greater in the United States than elsewhere, and the former holds true notwithstanding the fact that the working year is usually shorter in this than in most other countries. For the years under consideration the mines were operated from 195 to 258 days. The records show that each underground worker in 1901 averaged 3.37 tons a day and increased his daily output to 4.40 tons in 1918. The closest competitor of the United States for which the number of working days is shown is New South Wales where the daily output per employee is only slightly below that in the United States.

New South Wales

As a producer of coal New South Wales occupies a very low position among the countries here considered, its yearly output being about 10 million short tons, but in quantity of coal produced annually by each underground worker the country is second only to the United States.. The individual production has increased from 689 tons in 1901 to 814 tons in 1918 and the annual output for 18 years has averaged 718 tons. About 12,000 underground workers are employed.

The length of the working year is not given in the official reports except for the principal mines since 1909 which shows that the miners are employed from 168 to 238 days. Applying these figures to the entire colony it appears that the daily production of the underground worker increased from 3.32 in 1909 to 4.07 tons in 1918, thus indicating that New South Wales ranks as a close second to the United States in the daily as well as the annual output of coal per man. Approximately one-fourth of the annual production is machine-mined.

Most of the coal (over 65 per cent) is obtained from the mines in the northern district of the colony where the seams range in thickness from about 7 to 20 ft. with a probable average of about 12 ft. In the southern district most of the coal is mined from the Bulli seam which averages between 6 and 7 ft. in thickness. Among the underground employees only 3 per cent are below 16 years of age. No women or girls are employed underground.

Nova Scotia

Nova Scotia employs about 10,000 underground workers to produce between 6,000,000 and 7,000,000 tons of coal each year. With an average annual production since 1901 of 715 tons by each underground employee, the province ranks third among the countries now being considered, being slightly below New South Wales and considerably above British Columbia.

Prior to 1906 the individual output was above that in New South Wales, but in that year the Australian colony took the lead which, except in four instances, it has maintained down to the present time. Since 1901 the operating time of the coal mines has varied from 203 to 299 days, usually being about 280 days during the year. The daily output of the underground worker has varied from 2.45 tons to 3.35 tons with an average of 2.68 tons throughout the eighteen-year period. Thus in the daily as well as the annual output of coal by the individual worker, Nova Scotia occupies a position below the United States and New South Wales but above all other countries whose reports show the length of time the mines are operated. Of the total output of coal in 1911 at least one-fourth was machine-mined. In 1916 not less than 44 per cent was mined by machine.

British Columbia

With about 4,000 underground employees each yer, British Columbia produces between 2,500,000 and 3,000,000 tons of coal and thus contributes approximately one-fourth to the total production of coal in the Dominion of Canada. The total production is hardly to be compared with that of many other countries, yet British Columbia ranks fourth in the annual output per worker, being exceeded only by the United States, New South Wales and Nova Scotia. The individual output is about one and a half times that of Great Britain. The lowest annual tonnage was 494 tons in 1911 when labor troubles caused the mines of the East Kootenay district to suspend operations from April to November, while the maximum output was 790 tons in 1918, showing an eighteen-year average of 611 tons. The number of operating days is not given in the official reports, and therefore the daily output of the workers cannot be stated. Of the underground workers less than 3 per cent are boys (ages not given) and approximately 9 per cent are Japanese and Chinese. About 60 per cent of the coal production is from the mines of the coast district, although here the usual output per worker is considerably below that in the East Kootenay district. No Orientals are employed underground in the latter district, but in the coast district they at times comprise one-tenth of the underground workers.

The coal seams vary in thickness between wide limits, but it is probable that the average thickness of the seams of the entire province is about 9 ft. Information as to the quantity of machine-mined coal is not available.

Great Britain

Coal mining in Great Britain gives employment to between 800,000 and 900,000 underground workers each year and the annual production is around 300,000,000 short tons. During the war the production was somewhat less. The output of coal averaged 400 tons for each underground employee in 1901 and increased to 419 tons in 1906, but since the latter year there has been a decline in the individual output which continued down to 1918 when the output per man was only 337 tons. The decrease is also noticeable in the daily output of coal per man which has also receded from its high record of 1.55 tons in 1905 to 1.19 tons in 1918, the lowest during the last eighteen years.

The decrease in the annual production of the British miner is beyond doubt due to the lower daily output per man rather than to a reduction in the number of working days to the year. In fact, the lowest annual output per man has been during the years of the greatest number of working days, and this in spite of an annual increase in the use of coal-cutting machines. The working year has fluctuated between 261 and 265 days, being above 270 days eachc year since 1910.

Coal-cutting machines are coming into more general use in the coal-mining industry of Great Britain. In 1901 only 345 machines were used with which about 2 per cent of the entire output was produced. In 1918 the number of mining machines had increased to 4,041 and the quantity of machine-mined coal was over 11 per cent of the total production for that year.

While the coal seams vary in thickness from about 1 ft. to 30 ft., it is perhaps safe to say that the seams throughout the kingdom have an average thickness of about 5 ft. About 7 per cent of the underground employees are boys below 16 years of age. No women or girls work underground at the mines.

Prussia

Among the coal-mining nations of the world Germany ranks third, occupying a position considerably below that of Great Britain and very much above that of France. Over 90 per cent of the coal production is from the mines of Prussia and the figures for that kingdom are here used as representative of the empire as a whole, for which complete and comparable statistics are not available. While varying considerably from year to year, the annual coal production of Prussia is roughly speaking 160,000,000 short tons, although in 1913 it almost reached the 200,000,000 mark. Normally, about 440,000 underground workers are employed. For these employees the record shows an annual production ranging from 352 to 459 tons per man. The individual output in Prussia surpassed that in Great Britain for the first time in 1911. This is due, however, largely to the greater number of days during which the miners in Germany are employed. The number of working days to the year, always high, has shown an almost constant increase, being 293 in 1901 and 308 in 1914, the latest year for which the working time is shown. The daily output by the Prussian miner was until 1911 less than that of the miner of the United Kingdom, but from that year until 1914 the individual output of the miners in the two countries has been practically identical. The daily production in Prussia has ranged from 1.22 to 1.32 per man. No women or girls are employed underground.

About 65 per cent of the coal production of Prussia is obtained from the Dortmund district which includes the coal basins of the Lower Rhine and Westphalia, and here also are employed about 65 per cent of the underground workers. The Dortmund district, however, does not produce the largest tonnage per man, being surpassed by Upper Silesia both in the annual and daily output of coal per man, and this notwithstanding the fact that the miners of Upper Silesia usually work a somewhat smaller number of days than do the miners in the other districts of Prussia.

France

Among European countries France ranks third with its annual production of 40 million tons of coal, and thus normally occupies a position below Prussia but considerably above Belgium. The output has, of course, been greatly reduced since the destruction of the mines in the northern part of the country.

The quantity of coal produced annually by the French miner does not vary much from year to year, the amount being 278 in 1902 and 307 in 1913 with an average of 302 tons over a thirteen-year period. Later figures cannot be given because of lack of information as to the number of employees and number of days of operation. The daily output of the miner in France is usually a fraction over one ton, but in 1917 and 1918 it fell below this figure in spite of an increase in the average wages paid to the underground workers in those years.

The mine workers are usually employed about 300 days during the year. No women are employed underground, but about 6 per cent of the underground workers are boys between 16 and 18 years of age and 6 per cent below 16 years. The average thickness of the coal seams is probably somewhat less than 3 ft. 3 in., which indicates an average thickness slightly above that in Belgium. About two-thirds of the coal produced prior to or above that in most of the other coal fields of France, is slightly below the individual production in the coal basin of Le Creusot et Blanzy which furnishes only 6 per cent of the annual output of coal.

Austria

Excluding the lignite industry, the coal mines of Austria employ about 52,000 men underground and the annual production is around 17,000,000 short tons. The official reports do not segregate the employees underground from those on the surface except in connection with the statistics of wages and hours of labor, and the totals thus given do not exactly agree with the number of employees reported in connection with the output of coal. However, this segregation has been used to determine the production per underground worker, and on this basis it may be seen that the annual output has ranged from 250 tons to 351 tons per man. The daily output varied from 1 to 1.21 tons per man until 1912 since which time no information is available as to the number of days the men have been employed during the year.

During the twelve-year period beginning with 1901, the working year of the Austrian miners did not change materially, having varied only between 268 and 279 days

per year. No women or girls are employed underground, but about 11 per cent of the underground workers are boys presumably below 16 years of age.

Nearly two-thirds of the coal of Austria is obtained from the provinces of Moravia, Silesia and Galicia, the coal seams in Upper Silesia being a continuation of those of Prussia and Russia. An average of about 2 ft. 8 in. obtains in the Ostrau-Karwin district which is the principal coal-mining district of Silesia. About one-third of the yearly output is from the mines of Bohemia, where the main seam of the Kladno-Rahonitz basin has a thickness of 20 to 36 ft.

Belgium

Prior to the world war, the Belgium coal mines employed in round numbers 105,000 men in the underground workings and produced about 25,000,000 short tons of coal. With the beginning of hostilities, there was a sudden reduction both in the output of coal and the number of men employed. This situation became worse as the war progressed so that in 1918 there were only about three-fourths the usual number of employees and the production was less than two-thirds normal. The yearly output per underground worker had averaged about 250 tons during the thirteen pre-war years, but fell to 200 tons in 1914 and remained thereabouts throughout the war.

That the reduction in the annual individual output was mainly due, however, to a shorter working year is shown by the fact that the daily output of the miners was only slightly below normal, being about .74 tons during the war as against .83 prior thereto.

Under normal conditions the miners in Belgium worked nearly 300 days each year, but in 1914 the number of working days fell to 263 and the following year it was 241. In 1917 the working time rose to 296 days but the following year it fell back to 288 days.

Mining operations in Belgium are carried on under great natural disadvantages. The coal seams are thin, averaging only 26 inches for the entire country. Moreover, the contorted and folded conditions of the seams and the great depth at which they lie render mining extremely difficult and greatly reduce the productive capacity of the individual miner.

The number of women employed underground in the coal mines of Belgium was 120 in 1901 and only three in 1912, since which year none have been employed. Boys between 14 and 16 years old usually comprise about 4½ per cent of the underground workers and prior to 1914 about 2 per cent of the underground employees were boys between 12 and 14 years of age, but since 1914 the employment of children of the latter age appears to have ceased.

Nearly three-fourths of the coal production is from the Province of Hainaut, where the deepest mines are situated, and there the individual tonnage is lower than that in Namur. However, the Province of Hainaut includes the Mons district where the coal seams (average 22 inches) are thinner than in other parts of Belgium, while the Province of Namur, although producing only 4 per cent of the coal production, contains the thickest seams (average 28 inches) in the kingdom.

Japan

Since 1901 the coal production of Japan has trebled in quantity, being slightly less than 10,000,000 tons in that year and reaching a total of 29,000,000 tons in 1917. The reports of the Japanese Bureau of Mines do not usually segregate workers underground from those on the surface, but based upon the segregation in the annual report for 1917 it may be seen that the underground employees have increased from around 56,000 in 1901 to 187,000 in 1917. The greatest annual increase in the number of employees underground was in 1907 when nearly 30,000 more men were employed than in the preceding year. The average annual output per underground worker has varied from 145 tons to 213 tons, the average for the seventeen-year period being 174 tons.

In 1907 Japan gave way to India in the annual output per worker, owing to the fact that India has shown an almost constant increase while in Japan the individual output has remained practically unchanged.

The individual daily production of coal in Japan has ranged from .72 tons to .94 tons per man showing an average of .76 tons for the entire period. The working year has varied from 201 to 251 days. In 1917 about one-fourth of the underground employees were women and girls. More than four-fifths of the workers underground, both men and women, were over 20 years of age; about one-sixth were between the ages of 15 and 20 years; and only a little more than 1 per cent below 15 years of age.

About three-fourths of the coal produced is obtained from the mines of the Island of Kyushu and especially from the Chikuho coal field in the northern part of the island where the coal seams vary in thickness from 4 to 33 ft., with a probable average thickness about 10 ft. The Chikuho coal field supplies about two-thirds of the production of the island of Kyushu and about one-half of the output of the whole empire. One-tenth of the annual production of coal is contributed by the mines of Hokkaido (Yezo) Island where the Ishikari coal field produces nearly all of the coal. The seams of this field have even a greater thickness than those in the Chikuho coal field, and the field will doubtless increase in importance as transportation facilities improve.

India

The coal mines of India which are regulated by the India Mines Act have an annual production of about 20,000,000 tons and employ about 95,000 men in underground work. In the production per man underground, India occupies a position below Belgium on the one hand and above Japan on the other. In this regard India gained the ascendancy over Japan in 1907 and an annual increase since that year has widened the margin of India's lead. The daily output of the Indian miners cannot be stated because the official reports do not show the number of days the mines are worked. Practically 85 per cent of the coal production is obtained from the coal fields of Bengal where the average thickness of the seams is approximately 9 ft. About 40 per cent of the undedrground mine workers are women. Something less than 1 per cent are boys and girls below 12 years of age.—Reports of Investigations, U. S. Bureau of Mines.

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As the Journal Views It

By-Products

The Ottawa (Canada) Gas Company is one of those institutions that do not feel that their responsibilities to their employees cease when they have paid them wages.

It feels also that it has a responsibility in making their work as safe as it possibly can.

For two years it has been drilling its employees in the prone method of resuscitation. It conducts also an electric business, and adopted this precaution to give especially any unfortunate that might be stricken with electric shock a chance to come back.

But for two years it's been all drills. There have been no shocks and no opportunity to actually try out the lessons learned.

A few days ago some of the Ottawa company were river-bathing with other citizens.

One of the latter went under and was under twenty minutes.

There was no sign of life when he was brought out.

Nevertheless one of the utility employees jumped on him and started to work.

An hour he persisted with scarcely a flicker of life manifest.

Then the citizen began to come back; brought back to life by a man who had been taught to rescue himself, not merely call a doctor; a man who had learned to know that even an hour's vain working did not indicate hope was extinct.

There was no money in this, of course, for the gas company; no direct return on the money invested.

Yet A. A. Dion, general manager of the company, is satisfied. To his mind at least it has been demonstrated that the time and money spent on drills was well spent.

Up in Ottawa they lay a great deal of importance on by-products.

This incident represented a by-product that spells good-will, and good-will oftentimes proves more valuable in the long run than really tangible assets.

The Tail Before the Horse

Because its predominance is too manifest to be disputed, people generally concede New York in the point of population.

But New Yorkers also like to make themselves believe their city leads in thought and progressiveness.

This despite the fact that with the best of natural harbors it is permitting minor ports by sheer push and enterprise to plume themselves that eventually they will rival her in attracting maritime trade.

That the horse car flourished long after all but historians elsewhere had forgotten it ever existed.

And so is New York consistently backward as to B.t.u. standards.

People elsewhere after a long lapse got it finally into their heads that there was no sense in simply spilling into the atmosphere B.t.u.'s that were useless, but required the consumption of a resource that in this country is dwindling and, with its diminishment, is finding even wider and more important uses.

New York is yet behind.

And with its vast population it is most essential that New York should be first in this important measure of conservation rather than last.

Had New York set for itself a sensible B.t.u. standard it wouldn't matter much whether the smaller fry followed or not. But New York trailing behind practically nullifies all that the progressive-minded smaller communities may accomplish.

New York, the biggest city of our land, is a confirmed trailer. The home of more educational institutions in the fields of science perhaps than any other city is consistently displaying itself the less progressive mentally than the smallest of hamlets.

The Composition of Certain Cements and Solders Into the Manufacture of Which Gas Enters

(*Continued from page* 122.)

gas man and will be omitted almost entirely. Others are of such importance that special articles could be devoted to them exclusively. In fact, it is proposed to deal at this time only with a limited few, such as come within the scope of the present article, and to reserve for future publication those that deserve a place to themselves.

Hardly a week goes by, however, that the industrial man does not run up against work of a nature involving one or another of these cements or glues, etc., and it is hoped that what will be said in this and subsequent articles will be found of practical value.

In cementing two pieces, the surfaces have to be clean in the same way as in the case of soldering two pieces of metal. Dirt and grease are sure to breed trouble. If the articles are well worked with lye it will produce the right result. If, however, lye cannot be used, then carbon bisulphide may be employed equally good advantage.

The surfaces to be joined should be brought into intimate contact with each other. This is important. Moreover, the cement should be brought into equally intimate contact with the surfaces. This is best done by heating the pieces to be joined in those cases where the cement is melted by heat, as in using rosin, shellac, marine glue, etc. This heating is of great importance and is usually neglected, to the detriment of the strength of the joint. This fact is understood by cement peddlers, and some of the really remarkable results achieved by them are almost entirely owing to this cause. Where solutions are used the cement must be well rubbed into the surfaces, either with a soft brush (as in the case of porcelain and glass) or by rubbing the two surfaces together, as in making a glue joint between two pieces of wood.

As little cement as possible should be allowed to remain between the united surfaces. To secure this, the cement should be as liquid as possible and thoroughly melted if used with heat; also, the surfaces should be pressed closely into contact, by screws, weights, cords, etc., until the cement has hardened. These mechanical aids help to displace the thin film of air which sticks closely to the substance.

Plenty of time ought to be given for the cement to dry or harden, and this is particularly the case in oil cements, such as copal varnish, boiled oil, white lead, etc. When two surfaces, each half an inch across, are joined by means of a layer of white lead placed between them, six months may elapse before the cement in the middle of the joint has become hard. In such cases a few days or weeks are of no account; at the end of a month the joint will be weak and easily separated, while at the end of two or three years it may be so firm that the material will part anywhere else than at the joint.

Hence, when the article is to be used immediately the only safe cements are those which are liquefied by heat and which become hard when cold. A joint made with marine glue is firm an hour after it has been made.

Next to cements that are liquefied by heat are those which consist of substances dissolved in water or alcohol. A glue joint sets firmly in twenty-four hours; a joint made with a shellac varnish becomes dry in two or three days. Oil cements, which do not dry by evaporation but harden by oxidation, are the slowest of all. Examples of these are boiled oil, white lead, red lead, etc.

One of the strongest cements, and very readily made, is obtained when equal quantities of rubber and shellac are melted together and well stirred. This is best done in an iron capsule placed in a sand bath and heated over a gas burner. It can be car-

ried out on a wholesale scale in a gas-fired cauldron furnace of the usual style. It is a combination possessing both hardness and toughness—qualities that make it particularly desirable in mending crockery. When this cement is used, the articles to be mended should be warmed to about the melting point of the mixture and then retained in the proper position until cool, when they are ready for use.

Acid-Proof Cements

Acid-proof cements are used for cementing containers, tanks, etc., which contain acid, as used by electroplaters, chemical concerns and others. An oaken tank if properly made will last some twelve or fifteen years if coated with a special cement which can be mixed together in a cauldron furnace heated by gas. It is made of Burgundy pitch, 150 parts; old rubber in shreds, 25 parts; pounded pumice, 75 parts. The rubber (or gutta-percha) is firstly melted. It is then mixed with the pumice and the pitch is added last of all. A hot iron passed over the surface smooths it and assists adhesion. Such a tank will resist sulphate of copper baths but not cyanide.

Another method is to melt together 1 part of pitch and 1 part of perfectly dry plaster of Paris.

Again, a good acid-proof cement is made by mixing a concentrated solution of silicate of soda with powdered glass to form a paste. This is useful for luting joints in vessels exposed to acid fumes.

There are several others which, however, do not require any heat in mixing, so that they need not be mentioned at this time.

A rather common acid-proof cement is made from 100 parts of sulphur, 2 parts of tallow and 2 parts of rosin. This is melted in a gas-fired cauldron furnace as before and sifted ground glass is added.

Again, the following is also used: Rosin, 1 part; sulphur, 1 part; brick dust, 2 parts. The whole is melted after careful mixing. In this case it is desirable to have an agitator or mixing device in the cauldron furnace. This lute is proof against the attacks of nitric and hydrochloric acid vapors.

By melting 1 part of pure rubber in 2 parts of linseed oil and adding 6 parts of pipeclay, a good mixture will be produced. This must be thoroughly melted and stirred before use. A hot rod of iron may be used to melt it into the crevices. They can be used for any ordinary type of battery, as well as other classes of work of a similar nature.

The last of these acid-proof cements which will be given here is made by melting in a water-jacketed cauldron furnace 2 parts of tallow and gradually adding (until it is all dissolved) 30 parts of pure rubber. When thoroughly melted, 2 parts of slaked lime are added.

Aquarium or Water Cements

The majority of these cements are made "in the cold," but some are heated during their manufacture and it is these which will be described.

The first is made of 3 parts by weight of linseed oil 4 parts of tar and 16 parts of rosin. These are melted in a gas-fired cauldron furnace. If too much oil is used the cement will "run." To obviate this, it should be tested. This is done by testing it—i. e., cooling it—under water. If it is not found sufficiently firm it must be allowed to simmer a little longer, or else some more tar and rosin must be added. The cement must be poured onto the corners or angles of the aquarium or other article while warm (not hot). This cement is pliable and is not poisonous.

Another is made of pure rubber, 4 parts; black pitch, 8 parts, and shellac, ¼ part. This is melted in a sand-jacketed cauldron furnace and stirred together. It is then poured out on a wet slab and rolled into sticks for use.

Cement for Barrels and Casks

The "pitching" of beer kegs is well known by gas men, and although this class of work is far less than it was previously, yet there is still a good deal of it carried out. That operation is by no means the only one of its class. There is, for instance, a "closing" cement. This is made of 5 parts of tallow, 4 parts of wax, 8 parts of lard and 5 parts of sifted wood ashes. This is applied by the aid of heat, and a brazing burner or other gas "torch" is frequently used to good advantage for the purpose.

For leaking barrels, a mixture of lard, 30 parts; rock salt, 30 parts; wax, 10 parts, and paraffine, 6 parts, is melted at a low temperature.

Headway Made in Setting Up International Chamber of Commerce

The work of setting up the machinery of the newly organized International Chamber of Commerce is now under way in the temporary headquarters, at 33 Rue Jean-Donjon, Paris. The permanent headquarters, which will be determined by the Board of Directors, will probably be located at the seat of the League of Nations.

Dr. Edward Dolleans, professor of political economy at the University of Dijon, who is the temporary secretary general of the International Chamber, is directing the work of putting the machinery in motion. He is being temporarily assisted by David A. Skinner, secretary of the Chamber of Commerce of the United States.

The outlook for the business "League of Nations" is very promising, according to American delegates who have returned to the United States from the Paris conference where the International Chamber was formed. They report that no more earnest group of men ever met for a greater cacuse than the 500 delegates from France, Italy, Belgium, Great Britain and the United States—the five foundation countries—who gathered for the purpose of building the machine which would be set in operation to deal with commercial problems between the nations.

American delegates point out that never before had the business interdependence of the world's commerce and the acute character of many of the pressing commercial, financial and economic problems been formally recognized. Nor had there even been such a serious and united effort made to find common ground on which unity of thought and action might take place. One enthusiastic delegate expressed the opinion that the International Chamber of Commerce will come to be the spokesman and guardian of the International affairs of production and distribution. With the lapse of a few years he predicted that the machinery of the International Chamber will be working so smoothly that most of the present difficulties of international trade will be largely eliminated.

At the headquarters of the International Chamber

will be centralized data concerning economic and social conditions, the facts of production and requirements, and the possibilities of future production and requirements. It will at as a co-ordinating, instrument for suggesting regulations and legislative measures to facilitate and encourage economic intercourse. It will also place at the disposal of members and of official agencies reports and conclusions which may be issued in accordance with its articles or constitution, and will form public opinion through publication of facts concerning business and economic conditions.

An idea of the broad extent of the work which the International Chamber means to cover may be gleaned by mentioning some of the points which were included in the prograam of the conference, as follows:

To make import and export trade easier.

Safeguard international trade against unnecessary waste and fraud.

Standardize international documents, practices and laws affecting commercial intercourse.

Remove international friction, much of which begins with commercial differences.

Increase the total production of the world, and make the product available to the people of the world.

Increase the mutual profit in international transactions, thereby promoting international friendship which is the basis of peace.

Cultivate personal friendship between business men and bankers of different nations, thus reducing prejudice and misunderstanding.

The constitution of the new organization provides for a board of three directors and three alternates selected by each of the countries represented. The American directors are John H. Fahey, formerly president of the Chamber of Commerce of the United States, of Boston, Willis H. Booth, of New York, Edward A. Filene, of Boston. The alternates are: Harry A. Wheeler, formerly president of the Chamber of Commerce of the United States, of Chicago, William Butterworth, of Moline, Illinois, Owen D. Young of New York. The Board of Directors has the authority to admit business organizations in countries that apply for admittancec, and can select a limited number of additional directors from countries not already represented on the Board.

Resolutions were adopted covering almost every phase of international commerce. One resolution offers the co-operation of national and local Chambers of Commerce with governments to reduce national and local government expenditure or administrative personnel. The resolution recommends that "intimate collaboration between governments and their respective business organizations be actively encouraged in order that public confidence may be revived and that labor and capital alike may be inspired to make the greatest effort to restore prosperity and plenty throughout the world."

Another resolution was adopted urging the formation of a special committee to study the advantages of establishing a bureau of exchange of foreign credits on the basis of reciprocal relations for the use of exporters.

Another resolution advocating an amendment to the present inequalities of treatment granted to foreign banks in different countries.

Discussion of the question of the world's supply of petroleum led to the adoption of the resolution proposing that in view of the world's shortage of petroleum, prospecting for new sources of new development should be made from special concessions. T. A. O'Donnel, of the American Petroleum Institute, stated that deposits of petroleum in the United States, while at present adequate, would soon be depleted and the country would then be faced with a serious shortage. "Mexico, on the other hand," stated Mr. O'Donnel, "had practically unlimited quantities of untouched petroleum which under Diaz's administration were free from exploitation but which, under the recent regimes, have been closed to the world."

A resolution was also adopted calling for the appointment of a committee to investigate from a legal standpoint the mischievous use of trade names and providing that this committee should prepare reports and distribute them among delegates sixty days before general meetings of the International Chamber. Such a committee will be organized by each national chamber and will be urged to give serious study to unfair competitive methods, with a view to advocating special legislation in regard to it.

The conference also adopted a resolution calling for the establishment of a customs tariff of the allied nations according to a common nomenclature. This resolution further recommends to the interested governments the establishment of a technical commission to unify customs regulations in the allied countries.

The revoking of import and export prohibitions as soon as the internal conditions of each country allows, was advocated in another resolution.

An important action was taken by the International Chamber in establishing a central bureau of international statistics for the purpose of collecting, centralizing, analyzing and interpreting statistical information for the business interests of the world. To that end a degree of uniformity, a classification of statistics and methods of determining value was recommended to the various nations.

The following recommendations were made to all countries:

To hasten the utilization of hydro-electrical power in every possible way.

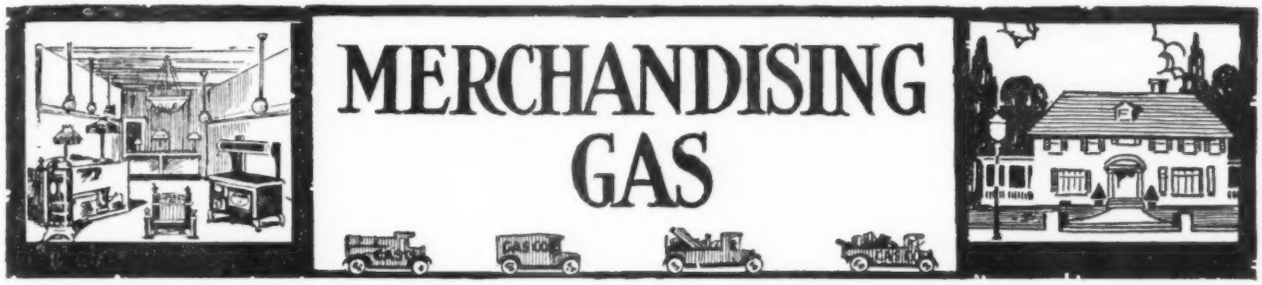
To hasten the carrying out of the measures which tend to have mineral fuel used in the most scientific and economic way.

To develop to the utmost the coal resources of the world.

The special consideration of allied nations to the distribution of excess products to allied nations during the period of reconstruction is urged in a resolution.

The convention went on record as distrusting Germany's intentions to fulfill her obligations to the allies as accepted by her in signing the treaty at Versailles.

The resolution presented by A. J. Hobson, chairman of the British delegation, and seconded by Chas. F. Coffin, on the American delegation, after stating that the reconstruction of France, Belgium and Italy is the most urgent question before the meeting, set forth, that within the opinion of the convention, Germany has failed to reduce her army as promised by the terms of the treaty and has given no evidence of intention to do so; and concludes by urging upon the governments of the allied nations that no further delay from the German government be tolerated. Copies of this resolution were sent to the premiers of the five allied nations represented in the convention.



Peterson Begins Three-Point Advertising Campaign

By S. G. Addison

Peterson had been taking so many photographs of industrial, hotel and other interesting gas installations that the Old Man at Blankville feared he was becoming too extravagant. In fact he suspected that Peterson was making it a sort of a hobby. Although the new sales manager had always made good, the Old Man and the rest of the board had never quite recovered from the opinion that he was a "nut" and that sooner or later he would take some step that would mean another dismissal from the company.

Nevertheless, he had rendered to the company service so much more efficient than that rendered by any other sales manager the company had employed that the Old Man did not wish to lose him. Therefore, he decided to remonstrate with him and persuade him to be less extravagant along this line of photographing everything. Already the expense had become great enough to attract the attention of some of the other members of the board and it was likely to be discussed at the next meeting.

Accordingly he called Peterson to his office and asked him: "What are you planning to do with all the photographs that you have been taking? You know that your photographer's bill has run up higher during the last few months than the amount the company has ever paid out for that purpose before in a whole year. Have you any plans for making this expense a good investment?"

"I have," replied Peterson, "but I did not want to go over these plans with you fully until I was certain that I would be able to gather together enough material to make it a success. I now know that I can do so and that the results which we will secure will more than offset the time, effort and money that it will cost.

"My first plan for using these photographs is to give each salesman a complete set to use in securing new business. I find that when a prospect can see photographs of installations similar to that which we are trying to sell to him, he is impressed and it is easier to sell to him. I am planning to give to each salesman a portfolio containing a print of each photograph and data about the installation."

"That would all be very well," objected the Old Man, "if everyone of our customers were satisfied customers, but unfortunately that is not the case. When you show photographs in this manner you are inviting the prospect to call and see the installations. It may happen that at the time he calls the consumer may have a grievance against the company and advise against the installation."

"You are right," agreed Peterson; "that is certainly a weak point in the use of photographs. It is necessary to remove photographs from all the portfolios of all installations that have been removed or where the consumer is seriously dissatisfied. The second part of my plan, however, will, I am sure, make all large consumers better friends of the gas company than they have ever been in the past."

"Well," remarked the Old Man, "I will have to admit that we have never had so many or so good friends among our consumers that we cannot afford to have a few more. It has always seemed strange to me that while manufacturers, jobbers and retailers are able to build up a good will among their customers which is worth a great deal of money, in some cases even millions of dollars, public utility companies seem to be doing well if they can create enough good will to make it possible to have rate increases that are absolutely necessary for breaking even, approved by the state and city commissions and suffered by the public. In fact the number of receiverships in the tractiion field show that traction companies have not even been able to do that. As a result it looks to me as though a good many traction companies will have to go out of business. I am under the impression that most traction companies would be glad to sell out to the cities in which they operate, provided the cities would make them even an offer considerably below the actual value of the property. It would be cheaper for them to sell than to continue to operate under present conditions. We certainly need a great deal more good will than is the case at the present time in all public utility operations."

"I believe," continued Peterson, "that the reason why public utilities have not enjoyed greater good will in the past, than they have, is due to the fact that they have not conducted their selling departments in a way that would lead the public to consider that the companies were trying to do anything more than to get all the money they can and give as little as possible in return.

"As far as we are concerned, I am going to try to correct this impression and make these photographs help me do so. Perhaps this advertisement which is one of a series which I am having prepared will show you better just how I am going about it.

"To make the greatest success, I am certain that a gas company must do three things in its sales promotion work. First in importance, I believe, is showing the public that it has a real interest in the city. The public has allowed the company to use public property through which to lay its mains and in return it expects the company to take a real interest in the welfare of the city.

"Second, I would place the interest taken in the consumers. I know that there are many manufacturers and jobbers in this country who have

built up very profitable businesses largely through the work which they have done to help their consumers or dealers. It is truly remarkable, the extent to which this work has paid.

"I place third and least important of all, proving to the stockholders and directors that the revenue will increase dividends. I fear that in the past too much attention has been given to pleasing the stockholders and directors and not enough to pleasing consumers and the public. As a result no one of the three groups has been satisfied."

"I think I see your point," said the Old Man. "In this advertisement you have appealed to the civic pride of the community by dwelling upon the part that the Blankville industries play in the prosperity of the nation. You have handled the matter in such a way as to make the people of this city proud of it. That, as I understand it, covers your first point. You show that we are interested in the city by advertising the good qualities of the city and increasing civic pride.

"You have continued along this line by telling about the Blankville Watch Company and showing what a really important concern it is. It seems to me that this is an extraordinarily good advertisement for that company. It ought to sell a good many of their watches here in this city. I should imagine that the concern would be pleased with it. Have you shown the copy to their advertising manager?"

"Yes. It would not be safe to use copy of this nature without having it O.K.ed by the advertising manager before we use it."

"That is right, and I am glad that you have taken that precaution. Down at the bottom of the advertisement you have advertised our service by showing that the perfect temper of the springs is secured by the use of gas furnaces. Do you think that you have given the gas company as much space as it deserves? You know that it is the gas company that is paying for this."

"Before starting the preparation of this advertisement and the others of the series, I gave that point very careful consideration. I judged that the illustration made from the photograph would be our main advertisement. I have planned to have the illustrations occupy about half of the space in each case. The rest of the space I have divided equally between the city, the consumer and ourselves.

"The consumers whom I have asked to co-operate with us have been very enthusiastic over the idea and I am sure that it will prove a success. As a matter of fact there is already a greater feeling of good will towards us than there was before I suggested this plan. A number of the members of the different concerns whose advice I asked in regard to the campaign have expressed their opinion that we are working along the right lines and have shown me how successful they have found a similar type of advertising.

"You know that there are a great many manufacturers who advertise other manufacturers in order to advertise themselves. We find this in every field of manufacturing. There are a number of manufacturers here who are finding it successful. It is a method that gets down to brass tacks and shows that the concern is as much interested in the success of its customers as it is in its own success."

"You certainly do make the plan look good," agreed the Old Man. "It is something that we have never tried and you have been so successful in selling the idea to me that I am going to defend your action for the time being, anyhow. How often do you plan to run these advertisements?"

"One a day until I have covered all the industrial and hotel consumers. Then I am going to check up results and find out if it will pay to repeat."

Holders of Temporary Liberty Bonds Urged to Exchange for Permanent Bonds Now Ready

Those Who Have Not Exchanged Before September 15th Will Have No Way of Collecting Their Interest on That Date

Holders of six million temporary 4 per cent and 4¼ per cent coupon Liberty bonds in this Federal Reserve district who have not exchanged their temporary bonds for the permanent bonds with all coupons attached are entitled to do so, under regulations of the United States Treasury, by surrendering their temporary bonds to their own banks or to the Federal Reserve Bank of New York. The permanent bonds of all issues are now ready for delivery, except the permanent First Liberty Loan Second Converted and Fourth 4¼s, which will be available on dates to be announced later.

There is no way for the holders of the temporary bonds to collect interest due after the date of the last coupon on the temporaries unless they exchange them. The exchange should, therefore, be made without delay. The new permanent bonds have all coupons to maturity and do not have to be exchanged again. These exchanges have been taking place for several months, and the larger investors in Liberty bonds have promptly effected the exchange and obtained the new bonds. It is the small investors, composing the mass of Liberty bond holders, not accustomed to cashing bond coupons, who are urged to get the permanent bonds to which they are entitled, and thus benefit by being able to clip their coupons and collect the interest when due.

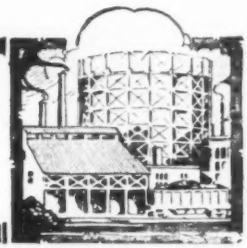
The banks are ready to accommodate their customers in effecting these exchanges, and the Federal Reserve Bank of New York has established a branch of its Government bond department at 19 West Forty-fourth Street, in New York, where exchanges can be made over the counter by individual holders who do not use the facilities of the banks. Over four million of the Third Liberty Loan 4¼s are now outstanding, and unless these bonds are exchanged before Sept. 15 the holders will have no way of collecting their interest on that date.

The Federal Reserve Bank of New York as fiscal agent of the United States urges bondholders owning temporary coupon First Liberty Loan Converted 4s and 4¼s, Second 4s and 4¼s to exchange them at once through their own banking channels where possible and receive the new permanent bonds.

Los Angeles Co. to Lay 60 Miles of New Gas Mains

Two million, five hundred thousand dollars will be spent by the Los Angeles (Cal.) Gas and Electric Company this summer in the construction of 60 miles of gas mains and in other improvements. "The rapid growth of the city necessitates work this summer on a larger scale than ever before," said William Bauhyte, vice-president of the company.

NEWS OF THE GAS INDUSTRY



New Jersey Public Service Co. Granted $1.40 Gas Rate and 525 B.t.u.

Authority to increase its rate from $1.15 to $1.40 per thousand cubic feet of gas in the territory as far south as Camden and reduction from 600 to 525 units in heating standard of gas has been granted to the Public Service Gas Company of Newark, N. J., by the Public Utilities Commission.

A gradual reduction in the rate is provided for with the consumption of more than 20,000 cu. ft. of gas a month. The company's application for an increase to $1.55 per thousand cubic feet was denied, and the commission has stipulated that adjustments necessary in gas appliances to conform with reduction in the units fixed as the heating standard of gas must be made without charge to consumers. The commission ruled that the change must be completed before Nov. 1.

The action of the commission, it was said, was based largely on the showing made by the New Jersey Gas Association with regard to the threatened oil shortage.

There is a demand in excess of supply for crude oil, according to officers of the association, with a consequent marked increase in the cost of oil, which materially affects the manufacturing cost of gas.

The gas association's arguments were sustained in the report rendered by the Public Utilities Commission.

Baltimore G. & E. Report

A statement filed with the Public Service Commission by the Gas and Electric Company, Baltimore, Md., shows that in the three months ended June 30 the company increased its net surplus $231,426, as compared with the same period last year and that in the six months ended June 30, the increase was somewhat smaller—$201,654, as compared with the same six months of 1919.

For the six months period the company earned gross $7,613,211, and operating expenses and taxes were $4,856,229, leaving a net revenue of $2,756,981; fixed charges $1,198,307, reduced the balance to $1,558,674 which was available for depreciation and dividends. Payments of $548,-151 to the depreciation account and of $548,296 to dividends left $426,226 which was available for surplus and for contingencies. The sum available for surplus and contingencies in the six months ended June 30, 1919, was $224,572.

Gas Companies Refuse Gas to Inflate Balloons to Take Part in National Balloon Races at Indianapolis

How one of the big gas companies of the country views its responsibilities to the community it serves, in this period of coal shortage, came to light when J. D. Forrest, general manager of the Citizens Gas Company, of Indianapolis, absolutely refused to allow his company to supply 21,000,000 cu. ft. of gas for the inflation of balloons scheduled to have started in national and international balloon races from the Indianapolis Motor Speedway in September and October. The story came to light when the refusal of Mr. Forrest to divert the large amount of gas needed for the races brought a halt to the entire series of plans for the races.

The critical condition of fuel supply is Mr. Forrest's reason for refusal. He declared that such a use of gas at this time would be "criminal." He said that he notified the Speedway officials some time ago of his position in the matter. The gas company, he said, could manufacture the gas if necessary, but that he is unwilling to provide even 1,000 cu-ft. of gas for the purpose contemplated, which, he said, would be a complete waste of fuel.

"There is no city in the United States," Mr. Forrest said, "that should, under present conditions, undertake to provide gas for this purpose."

The national balloon race was scheduled for Sept. 11 and twelve balloons had been entered, five of them from the army and navy. The three winning balloons were to represent the United States in the international balloon race, in which balloons from Great Britain, France, Italy and Belgium were to participate.

Answering Mr. Forrest's statement, Major Charles J. Glidden, of New York, chairman of the racing committee of the Aero Club of America, which had been notified of the gas company's decision as soon as it became known, said that the governments of Great Britain, France and Italy, as well as the United States government and many individuals, were counting on a supply of gas in Indianapolis and had arranged their plans accordingly. Word of the hitch in affairs was telegraphed to Major Glidden by Theodore E. Myers, manager of the Speedway.

Major Glidden was quoted in Indianapolis as saying:

"Eight foreign entries for the international races will require 900,000 cu. ft. of gas, while fifteen entries in the national contest demand no less than 1,200,000 ft. Some of the balloons expected to enter the races will require 80,000 cu. ft. of gas for one filling. Much expense already has been paid out in making arrangements to ship them. It is important that the races should start at a point no farther north than Indianapolis in order to take advantage of the favorable winds prevailing in the West during the autumn months."

Thirteen cities, including as far west as Los Angeles and Seattle, have been queried by the Aero Club in an attempt to locate sufficient gas to insure the start of the races. Mr. Myers said that it is possible that the situation might necessitate the indefinite postponement of the races as he understands that gas companies in other cities also may refuse to provide gas.

Mr. Myers said that although there had been no contract between the Speedway officials and the gas company regarding a supply of gas, Mr. Forrest said at the time Indianapolis was chosen as the starting place that so far as he then knew, the gas company would be in position to furnish gas for the inflation of the balloons.

City Fights Gas Rate Decision

Seventy-five exceptions, covering seventy-seven pages, to the report of Special Master A. S. Gilbert on the Consolidated Gas Company, New York, on which was based the recent court decision allowing the company to charge $1.20 per 1,000 ft. of gas, have been filed in the Federal District Court by Charles D. Newton, State attorney general; Lewis Nixon, public service commissioner, and Denis O'Leary, district attorney of Queens County.

The three officials were enjoined by the court decision from enforcing the 80-cent gas law.

In the exceptions they assert that Special Master Gilbert failed to find that the evidence received covers the years 1918 and 1919 and the first five months in 1920. This period was abnormal and unprecedented, they state, and therefore the findings as to the cost of making gas were no criterion. The tabulation should have embraced a much longer period of the company's business, they state in the brief.

The court is therefore asked to set aside the findings on the ground that they are not supported by the evidence and are contrary to the evidence taken at the trial of the case.

In sustaining the complaint of the gas company, Gilbert has, among other things, declared:

"During the twelve months ended December 31, 1918, and the twelve months ended December 31, 1919, and during the portion of 1920 covered by the proofs before me, and during all and each of the periods so indicated, the operating revenues of the complainant company were not sufficient to pay the reasonable and necessary costs of the manufacture, transmission and distribution of gas and to provide a reasonable return upon the value of the property used and owned by the complainant in the manufacture, transmission and distribution of the gas sold by it to its consumers.

"During the months ended December 31, 1919, and during the portion of 1920 covered by the proofs before me the said net operating revenue did not and does not at the present time provide any return whatever upon the said present value of any of the property so owned and used by the complainant company as hereinbefore found."

Asks Gas Rate Increase

The Southern Counties Gas Company, Los Angeles, Cal., wants to increase its rates for surplus natural gas sold to industrial consumers in its eastern district, comprising the Orange County, Whittier, Monrovia and Pomona divisions. In an application filed with the State Railroad Commission the company sets up that its present rates, which were made low in order to induce consumption of natural gas by industial users, are no longer adequate when measured from the cost-of-service standpoint. They were based, the company asserts, solely upon the value of the service to the consumer as measured by the cost of competitive fuels and not upon the basis of the cost of service.

The company declares that it is facing the necessity of expending large sums for system extensions, approximately $233,000, and that to make a better showing to investors.

Would Cut Off Gas Supply of Industries—Plans to Conserve Supply to Heat Homes

Natural gas, which is the "breath of life" to hundreds of industries in western Pennsylvania, where no other source of power has been used for years, is being exhausted so rapidly that the supply is to be arbitrarily cut off from industries in this State during the colder weeks of winter, in order that enough may be had by the homes in the district which are dependent upon it entirely for heat and light.

Stringent rules to forestall as much as possible the gas famine were drafted at a number of conferences in the Bellevue-Stratford Hotel in Philadelphia, Pa., between Public Service Commissioners of Pennsylvania, New York, Ohio, West Virginia and Maryland.

W. B. Ainey, chairman of the Pennsylvania Commission, took part in the conferences, and John S. Rilling, a commissioner from Erie, was chairman of the meeting. These two men will take charge of a meeting in the Bureau of Mines office in Pittsburgh, at which representatives of all the natural gas companies of the State will be present to be instructed on new regulations more drastic than any imposed by the Fuel Administration during the war.

The commissioners agreed that it would be necessary to cut off the supply of gas absolutely from many industries during those excessively cold days when houses will require a large supply for heat and light. The supply of natural gas, unlike that of artificial, cannot be stimulated to meet unusual demand, and so hardship must be caused in cold weather. The order will probably result, it was said, in many firms installing coal-burning machinery.

In the days not very far in the past, when natural gas seemed inexhaustible, the fuel was used in the region for every purpose, and most lavishly. One result of that was the use of coal stoves inefficiently rearranged in homes to burn gas, which the commissioners declare must be discarded, as no waste can be permitted. Rigid inspection of all gas-burning apparatus, according to rules agreed upon by the executives of the five States, will be imposed.

Participants at the conferences who came from the natural gas field about McKeesport reported this field rapidly being exhausted and many wells plugged.

The commissioners who met, besides Mr. Rilling and Mr. Ainey were: Edward D. Lewis of West Virginia, Charles Volz, New York; W. S. Strause, Maryland; B. M. Glendening, Ohio, and S. S. Wyer, of the United States Bureau of Mines.

Continental Gas & Electric Bonds

H. L. Nason & Co. are offering a new issue of Continental Gas and Electric Corporation two years, convertible collateral trust 7 per cent notes to yield 8.10 per cent.

This note is secured by the first lien collateral trust bonds the company which are in effect an absolute first mortgage all the company's properties.

The holder by converting, say in July, 1922, can extend investment five years in the first lien bonds on a 7.60 per cent basis.

The company was incorporated in 1912 in Cleveland, Ohio, when gross earnings were slightly over $300,000. These have grown to present gross earnings of over $1,700,000, with net earnings of $432,000.

Utica Gas & Electric Company Granted Increased Rates

From Aug. 10, gas rates in Utica, N. Y., will be increased 15 cents per thousand cu. ft., the Public Service Commission having granted the application of the Utica Gas and Electric Company.

The order of the commission, granting the application of the gas company provides that the Utica Gas and Electric Company's charge for gas for all purposes in Utica and adjoining communities included within the Utica territory for six months from Aug. 10, 1920, and thereafter until the commission shall otherwise order, shall be computed on a basis of net rates not in excess of $1.40 a thousand cu. ft. under a block meter schedule.

The present rate is $1.25 a thousand cu. ft. The new rate will be $1.40 a thousand.

Under the ruling, gas charges will be computed on a basis of net rates not in excess of $1.40 a thousand cu. ft. under this block meter schedule.

First 25,000 cu. ft. a month, $1.50 a thousand.

Next 25,000 cu. ft. a month, $1.40 a thousand.

Next 50,000 cu. ft. a month, $1.30 a thousand.

Next 150,000 cu. ft. a month, $1.25 a thousand.

Next 250,000 cu. ft. a month, $1.15 a thousand.

All over 500,000 cu. ft. a month, $1.10 a thousand.

Prompt payment discount, 10 cents a thousand cu. ft. Minimum charge, 50 cents a month.

Commissioner George R. Van Namee in a memorandum with the order reviews the evidence covering coal costs, showing an increase of $1.25 a ton since December, 1919, for grate coal, and 75 cents a ton for steam coal, the price increasing from $8.05 to $9.30 for grate coal, and from $5.21 to $5.96 for steam coal, and as to the resulting increase in the production cost of a thousand cu. ft. testimony was to the effect that labor increase since January 1 was 20 per cent.

Summarizing, the commissioner shows:

Cost of gas a thousand cu. ft. under ruling of April 1, 1920, $.995; increased cost a thousand cu. ft. gas oil at 15 cents, July 1, 1920, $.239; increased cost gas coal at $1.25 a ton July 1, 1920, $.022; increased cost of steam coal 75 cents a ton, July 1, 1920, $.014; 8 per cent return on the valuation proposed by the city on former hearinfi, $1.76; total $1.446.

The commission holds that on account of the uncertainty in present conditions and fluctuating prices of materials, it is deemed best not to file rates for a longer period than six months, and until further order of the commission.

High-Pressure Gas Service for Gardiner and Hallowell

High-pressure gas service, first class in every respect, for Hallowell and Gardiner, Me., is assured for the very near future by the Central Maine Power Company.

Two big high-pressure storage tanks recently were delivered to the company and they are in the process of installation at the Augusta Gas Works. These, with a 60-hp. electrically driven compressor and a new high-pressure gas main from Augusta to the Hallowell substation, will insure an ample and steady supply of gas for both Hallowell and Gardiner.

Tanks and pipe have been received and all the remaining necessary equipment is under shipment, and it is the company's intention to have this work completed as near Sept. 1 as possible to relieve the extreme low-pressure conditions now existing at Hallowell.

Big Gassers in Kansas

One of the largest Kansas gas wells of the year is reported to have been found in rather developed territory in Franklin County. The Pay Sand Oil & Gas Company has a gasser which is making 30,000,000 cu. ft. of gas daily. This is a region in which small oil wells are found ordinarily at shallow depths.

A big gas well with a flow estimated by oil men at five million ft. has been brought in seven miles northeast of Lawrence, Kan., at a depth of 735 ft. This is in Leavenworth County.

Staten Island Gas Company Asks for Rate Injunction

The New York and Richmond Gas Company, the only gas company on Staten Island, has made application to Supreme Court Justice Fawcett for an injunction restraining further enforcement of the $1 gas rate. The company claims that in eighteen months it has run at a loss of $180,000. William H. Welsh, president of the company, through his counsel, ex-Assistant District Attorney Innis, of Richmond, says:

"When the company shall have reached a point where it cannot longer pay its operating expenses and it will therefore be unable to pay for the necessary labor and material and supplies to manufacture and distribute its gas, and its actual cash shall have been exhausted, it will discontinue its operations and will only resume when it is enabled to receive a price or sum for its gas which will pay such costs and provide a fair and reasonable return on its property actually devoted to the public use."

Counsel for the Public Service Commission argued that the company now had a six months' contract for its gas oil requirements, and when Justice Fawcett inquired why the shutdown was necessary under the circumstances Mr. Innis replied that the contract provided not only for gas oil requirements, but the payment therefor as well. It does not provide for the extension of six months' credit to the company, he said. Justice Fawcett adjourned further argument until next week.

Gas Bonds Authorized

Worcester (Mass.) Gas Light Company has been authorized by department of public utilities to issue $200,000 of 6 per cent mortgage bonds, dated July 1, 1919, and payable July 1, 1939, to cancel an outstanding issue of 4½ per cent bonds maturing Sept. 1, 1920.

E. C. Dillon, manager of the Huntsville (Ala.) Consolidated Gas Company during the last 10 years, has resigned and will go to New York to engage in other business. He will be succeeded by C. J. Demers of New Jersey. A small company of friends of Mr. and Mrs. Dillon gave them a farewell dinner in the Hotel Twickenham.

W. G. Lackey has resigned as vice-president of the Mississippi Valley Trust Company of St. Louis, and will join the forces of Marland Refining Company and Kay County Gas Company, Ponca City, Okla., comprising the Marland interests. In the position of vice-president he will direct supervision of the finances, of both companies.

So Long as Coal Prices Remain High, Utility Rate Increases Will Continue Uninterrupted

The Public Service Commission of Indiana has just notified the people of Indiana that unless some governmental agency immediately is successful in lowering the price of coal, the series of increases in rates to public utilities of all classes must continue uninterrupted. The rate increases must affect gas utilities, as well as all other classes of public service, the statement points out, and it sets out figures to support its contentions.

John W. McCardle, vice-chairman of the Commission, was the member of the body who gave the statement to the public. He reported on a survey of coal conditions among the utilities, made by the Commission during the last week of July, which showed that many utilities are unable to obtain more than 50 per cent of their normal coal supply at this time of the year.

Mr. McCardle referred to a statement made several days ago in the Indiana press by the Knox County Coal Operators Association, in which a list of prices for coal during the first six months of 1920 was given.

"The highest price received, according to the paid advertisements," he said, "was $2.94 in June, 1920. At the same time the Commission is advised, under date of August 6 by the Richmond City Water Works that it has just placed an order for five cars of Knox County mine run coal at $6.50 a ton at the mine. Whether the prices which the Knox County operators assert they received are correct or not the operators do not seem to be bound by these prices at the present time, and they are doing what every other group of operators is doing, collecting all the traffic will bear."

Pointing out that the Commission has been severely criticised as being a rate-raising body, Mr. McCardle said:

"The truth is there has been a continual advance in the price of coal for the last year, and when it is remembered that coal comprises about 50 per cent of the total operating cost of the average electric utility, the effect of increased coal prices can be more easily understood. The public does not seem to have considered the situation with which the utilities have had to grapple, or the situation with which the commission has had to deal, in order to keep the public utilities of the State at least one jump ahead of the sheriff.

"Within the last day or two the interurban railways have petitioned the Commission to establish passenger rates and freight rates authorized by the Interstate Commerce Commission for steam roads. The dilemma presented by the petition is perhaps the most difficult with which the Commission has had to deal thus far. On one hand the Commission is advised that the coal bills of the electric interurbans were increased enormously within the last sixty days. On the other hand the Commission faces the possibility of further increases operative to reduce traffic, thereby limiting the gross revenue of the companies, individually and collectively."

The survey made by the Commission, Mr. McCardle said, showed the situation to be most critical for gas utilities. Nine gas utilities of the state reported that they now have 12,373 tons of coal on hand, compared with 54,348 Aug. 1, 1919. Fourteen have contracts for coal, he said, while only two are getting 1000 per cent delivery, and most of the others are getting 5 per cent or less.

Reports from 161 electric utilities show ninety-one have contracts for their entire supplies of coal, the statement pointed out, five have some contracts and sixty-five have no contracts. Of the ninety-six having contracts, thirty-six have received their full contract requirements; two have received 95 per cent; seven, 90 per cent; five, 80 per cent; seven, 75 per cent; three, 70 per cent; one, 62 per cent; one, 60 per cent; thirteen, 50 per cent; four, 40 per cent; three, 34 per cent; three, 30 per cent; seven, 25 per cent; one, 15 per cent, and five have received none.

"The question which naturally arises, "Mr. McCardle said, "is what can be done? Manifestly the Commission must continue to increase rates as long as present conditions obtain. The Commission believes the problem must be attacked where its inception is found—namely, at the point where coal is produced and sold. Coal prices must come down. Either the State or Federal government, or both, must act and they must act with vigor. The Commission itself is powerless to ddeal with the coal situation. It must accept prices as they are and leave to other agencies of the Government the correction of this alarming situation."

Meanwhile the various state affiicials, authorized under the recently enacted coal-control law to take charge of the Indiana campaign to force prices down, are marking time until printed copies of the law are available. The appointment of a coal director, or some similar official, is prophesied, the appointment to come from the Indiana State Board of Accounts, where the coal problem now rests by reason of the recently enacted law. A discussion of the new coal law will be forthcoming in the immediate future, together with complete copies of the new act.

New Appointments in Department of the Interior

Director F. G. Cottrell of the Bureau of Mines announces the appointment by Acting Secretary of the Interior Hopkins, of F. B. Tough as supervisor, and R. E. Collom and H. W. Bell as deputy supervisors to administer the operating regulations on oil and gas leases under the Department of the Interior. Mr. Tough will be stationed at Denver, Colorado, and will have personal charge of operations in the Rocky Mountain fields, as well as supervisory charge of operations on government lands in all fields. Mr. Collom will be stationed at San Francisco, California, and will have charge of operations in the California oil fields. Mr. Bell will be stationed at Dallas, Texas, and will supervise operations in the Louisiana fields.

Mr. Tough is a graduate mining engineer. He has had seven years' experience in actual engineering and practical work for the Southern Pacific Company in the California oil fields and as petroleum technologist with the Bureau of Mines for four years. While with the Bureau of Mines, Mr. Tough has covered practically all the oil fields in the United States, and has done much work in correcting water problems in Illinois, Colorado, Wyoming, and California. He is the author of Bulletin 163, "Methods of Shutting Off Water in Oil and Gas Wells." For the past year and a half he has been in charge of the conservation work in the Wyoming fields, under the co-operative agreement with the Rocky Mountain Petroleum Association, which has contributed $30,000 a year for the Bureau of Mines to demonstrate methods of drilling and operating wells in order to minimize the waste of oil and gas and damage to oil and gas sands. This work under Mr.

Tough was so satisfactory that the Rocky Mountain Petroleum Association, consisting of the Midwest Refining Company, the Ohio Oil Company, and the Continental Oil Company, voluntarily suggested a renewal of the co-operative agreement for the second year. Mr. Tough will continue to supervise this co-operative work as well as performing his new duties.

Mr. R. E. Collom is also a graduate mining enginer. He has had a number of years' experience in the mining camps, but has spent most of his time in the oil fields of California. He was deputy supervisor for the California State Mining Bureau, where he worked principally in the Santa Maria oil fields, from which position he was transferred to San Francisco as assistant chief supervisor. Mr. Colom has been with the Bureau of Mines for one year, during which time he has been in many fields in the United States, and was in charge of the Dallas office of the Bureau of Mines for several months. Mr. Collom did excellent work in the Texas and Louisiana oil fields, particularly in the Wichita Falls and Ranger Districts, where, with the assistance of W. A. Snyder and J. B. Kerr, a number of operating problems were solved and valuable recommendations made to the oil companies. Mr. Collom is the author of a manuscript to be published by the Bureau of Mines relating to development problems in the oil fields.

Mr. Bell is a graduate mining engineer who spent a number of years in the mining camps, and then became interested in the oil business in Coalinga field, California, where he had much practical experience. For the past several years he has been with the California State Mining Bureau as deputy supervisor. He has recently been appointed as petroleum engineer with the Bureau of Mines to take charge of the Dallas, Texas, office. Government leases in Louisiana will be taken care of in conjunction with the demonstration work in Louisiana and Texas.

The supervisory work under Mr. F. B. Tough will cover the operating regulations to govern the production of oil and gas under the Act of February 25, 1920 (Public No. 146). These regulations cover only the active drilling, production, and gaging of oil and gas, the supervision of which has been assigned to the Bureau of Mines by Hon. John Barton Payne, Secretary of the Interior. Other regulations relating to the giving of leases and permits, collection of royalty moneys, etc., are under the supervision of the General Land Office.

The operating regulations, before being submitted to the Secretary of the Interior, were submitted to representatives of the oil industry in the states concerned, at a conference held in Washington under Assistant Secretary of the Interior Vogelsang, April 1 and 2, 1920. These regulations, therefore, have the approval of representatives of the industry with practical field and business experience in oil and gas. The administration of the regulations will be done by experienced engineers.

The Reorganization of Nela Research Laboratories

Nela Research Laboratory was organized in 1908 under the Directorship of Dr. Edward P. Hyde as The Physical Laboratory of the National Electric Lamp Association. The name was changed to Nela Research Laboratory in 1913, when the National Electric Lamp Association became the National Lamp Works of General Electric Company. For some years the laboratory was devoted exclusively to the development of those sciences on which the art of lighting has its foundation, but in 1914 the functions of the laboratory were extended by the addition of a small Section of Applied Science, which had an immediate practical objective.

The Section of Applied Science is now being largely extended as a separate laboratory of applied science under the immediate direction of Mr. M. Luckiesh, who becomes director of applied science, and a new building is being constructed to house this branch of the work, which will be carried forward with a staff of several physicists, an engineer, an architect and a designer, together with the necessary technical and clerical assistants.

Dr. Ernest Fox Nichols, formerly president of Dartmouth College, and more recently professor of physics at Yale University, has accepted an invitation to assume the immediate direction of the Laboratory of Pure Science, under the title of director of pure science. The work of this laboratory, which will be continued in the present building, will be somewhat further extended under the new organization.

The Laboratory of Pure Science and the Laboratory of Applied Science will together constitute the Nela Research Laboratories, and will be co-ordinated under the general direction of Dr. Hyde, who becomes director of research.

Kompak Company Appoints Pacific Coast Agent

The Kompak Company, New Brunswick, N. J., manufacturers of Kompak automatic water heaters, announces the appointment of the C. B. Babcock Company, of San Francisco, as Pacific Coast agent for the Kompak heater.

Under the arrangements made the C. B. Babcock Company will carry Kompak heaters in stock not only in San Francisco but in Los Angeles as well, and they will be in position to give immediate service both for delivery of heaters and for repair parts. This will insure to the gas companies and dealers of the Pacific Coast as perfect service as though the factory itself were located there.

In addition to California and Washington, the C. B. Babcock Company will also cover Arizona, Nevada, Oregon, Montana, Idaho, Utah and the Hawaiian Islands, and will co-operate with the gas companies in increasing Kompak sales.

Boston Man Buys Salem Gas Plant

Purchase of the plant and holdings of the Salem (Mass.) Natural Gas Company, by Godfrey L. Cabot, a capitalist of Boston, Mass., has been announced. Although the exact purchase price was not made known, the deal involved a considerable amount and is one of the largest in the county in recent months.

The fact that Mr. Cabot is also largely interested in the Bristol Gas Company, which also operates in the Salem field, leads many to believe that the two companies will be merged and operated under one management. Mr. Cabot is extensively interested in gas production and carbon manufacture in various other parts of West Virginia.

The Salem Natural Gas Company, which supplies fuel for domestic and manufacturing purposes in the Salem district, is the pioneer gas company of the Tennile metropolis.

Interesting Program Planned for 5th Annual Convention of South Central Gas Association

The fifth annual convention of the South Central Gas Association will be held at the St. Anthony Hotel, San Antonio, October 12th and 13th.

The following are subjects of a few papers already promised:

"Meters and Their Maintenance," by R. E. Davis, president Reliable Meter Repair Company, Houston, Texas.

"Breaking Even on Your Merchandise and Jobbing Departments," by J. J. Flautt, sales manager, New Orleans, Gas Light Company.

"Observations of Plant Management by an Outsider," by Luke L. Ballard, salesman, Pittsburgh Meter Company, Waco, Texas.

"Putting It Over," a talk on service by S. J. Ballinger, sales manager, San Antonio Public Service Company.

"The History of the Gas Meter," by Lee C. Duncan, salesman, Equitable Meter Company, Dallas, Texas.

In addition to the above, there will be a paper on some phase of the natural gas business by F. L. Chase, manager, gas department, Lone Star Gas Company, Dallas, and one by F. L. Weisser, superintendent, Public Service Company, San Antonio, Texas, dealing with the manufacturing end of the artificial gas business.

The above, together with round table talks, will furnish a full program, and no doubt will bring out a record attendance.

Correction

In the July 24th issue of the JOURNAL there appeared an item stating that the Boston Consolidated Gas Company, Boston, Mass., had been allowed a rate for gas of $1.30. This statement was incorrect as a decision of the Department of Public Utilities dated July 23 fixed the "standard price" of gas at $1.35, and effective on that day, an increase in the selling price has been made to $1.35 to consumers.

In the opinion of the Commission as rendered, this price is not intended as a final determination of what the "standard price" should be, but is placed at this figure in order to enable the company to obtain temporary relief under present operating conditions.

Four Indiana Cities Granted Increased Rates

The Public Service Commission of Indiana has just authorized gas rate increases in four Indiana cities—Goshen, Warsaw, Decatur and Bluffton.

The commission directed the Goshen Gas Company to increase its rates to a schedule ranging from $1.75 to $1.35 gross and $1.65 to $1.25 net a thousand cu. ft. A minimum monthly bill of $1.10 gross and $1 net was ordered. Permission to make certain meter changes was denied. The company was ordered to eliminate as far as possible smoke and noxious odors from its plant.

The commission has granted the petition of the Warsaw Gas Company for an increase to a schedule of from $1.95 to $1.55 gross and $1.85 to $1.45 net, a thousand cu. ft. A monthly minimum bill of $1 was ordered.

The Northern Indiana Gas and Electric Company received permission to increase its rates at Decatur and Bluffton to a schedule of $1.75 gross and $1.65 net a thousand cu. ft., with a monthly minimum of $1.

The Westport Natural Gas Company has petitioned the commission for an increase in rates to 50 cents a thousand cu. ft. with a monthly minimum of $1.

Adequate Rates Necessary

That the emergency confronting gas companies all over the United States is immediate and far-reaching, and that evidence presented by gas manufacturers in placing before the consuming public the real conditions confronting the gas industry is not for the purpose of obtaining excessive rates or unwarranted returns upon invested capital, is the declaration made by George B. Cortelyou, president of the American Gas Association. Mr. Cortelyou also makes the point, in a brief statement setting forth the immediate needs of gas companies, that they may continue a service so vital to such a large percentage of the people in the United States, that the interest of the public is just as great as the interest of the gas manufacturer. Mr. Cortelyou's statement is as follows:

"The emergency is immediate and far-reaching. It embraces the entire gas industry. Economic conditions—many of them of world-wide extent and influence—affecting the supply of coal, oil and other essential materials required in the manufacture of gas, of labor and of the funds needed to maintain and develop our properties, are not bogies invented by the industry to secure preferential treatment, excessive rates or unwarranted returns upon the investment. They are plain facts.

"All over this land to-day gas companies, great and small, are rendering, often under most adverse conditions, this service so vital to the welfare and comfort of our people. What they need and should have, in the interest of the public, is the reasonable certainty of adequate rates and sufficient supply of oil, coal and other necessary supplies, and such manufacturing and operating conditions as will utilize and conserve these materials, as well as contribute to all other economies of production and distribution."

Annual Meeting of American Society of Mechanical Engineers Dec. 7 to 10

The 1920 annual meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York City, from Dec. 7 to Dec. 10.

Sessions will be held on the subjects of "Appraisal and Valuation" and "The Application of Engineering to Woodworking."

The newly founded professional sections on management, power, fuels, machine shop, railroads and textiles will also conduct sessions to consider the vital problems in their field. In addition, a number of valuable papers will be presented at general sessions.

A memorial session for Dr. Brashear is planned, as a fitting tribute to his life and work.

New Hartford Has Its Own Gas Concern

The New Hartford Consumers, Gas Association has been formed in New Hartford for the purpose of conducting the gas making business taken over for a period of 60 days from Harry W. Walker of Bridgeport. The executive committee is composed of Frank D. Munn, chairman; B. L. Newton, F. D. Jones, John Rainey and G. T. Smith. Clarence Jones is secretary and treasurer. Several parties are negotiating with Mr. Walker for the purchase of the plant, said Mr. Munn.

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